

Appl. No. 10/617,852
Amdt. dated December , 2004
Reply to Office Action of September 23, 2004

REMARKS/ARGUMENTS

Application Amendments

As requested by the Examiner, the specification has been rewritten herein in a number of places to correct typographical errors. Most of these specification amendments serve to correct formatting errors for subscripts and superscripts.

Original process Claim 1 is rewritten to specify that the claimed process produces molecular sieves of the AEL or CHA framework types. Support for this amendment is found in the original description at Page 1, Paragraph 0001.

Original process Claim 1, and original molecular sieve Claims 20 and 23, are also rewritten to define the organic template used in the process and in the molecular sieves in terms of the general formula (I) found in original Claim 3. Language in Claims 1, 20 and 23 rendered redundant by the incorporation of the Claim 3 formula and its substituent definitions has been deleted.

Original Claim 3 has been rewritten to indicate that the preferred amines in the general formula are those wherein R and R' contain from 1 to 3 and 5 to 12 carbon atoms. Support for this amendment to Claim 3 is found in original Claim 7.

Original Claim 7 is rewritten to remove the carbon atom number ranges which have been incorporated into amended Claim 3. Claim 7 has also been rewritten to indicate that R and R' from the Claim 3 formula are branched alkyl groups but are not butyl. Support for this Claim 7 amendment is found in the original description at Page 11, Paragraph 0037.

Original Claims 21 and 24 have been rewritten to remove therefrom language rendered redundant or unnecessary by virtue of amendments made to claims from which they depend.

Upon entry of the claims amendments presented, Claims 1-30 remain in the application. No additional claims fee is due as a result of these amendments.

Appl. No. 10/617,852
Amdt. dated December , 2004
Reply to Office Action of September 23, 2004

Invention Synopsis

The present invention is directed to the synthesis of silicoaluminophosphate molecular sieves having an AEL or CHA framework type. By using as an organic template a selected type of tertiary butylamine, high purity molecular sieve materials can be prepared with a high degree of specificity to these particular framework types.

Formal Matters

As requested by the Examiner, a number of typographical and other minor errors have been corrected throughout the specification.

Rejections Under 35 USC 102/103

Claims 1-4, 6-13, 16-22, 27 and 29 have been rejected under 35 USC §102(e) as being anticipated by or, in the alternative, under 35 USC §103(a) as unpatentably obvious over US Patent No. 6,620,983 to Cao et al. (Cao '983). Such a rejection is respectfully traversed as it would apply to the claims as amended herein.

Cao '983 discloses a method for synthesizing aluminophosphate or silicoaluminophosphate molecular sieves of the CHA framework type. Synthesis of such molecular sieves of this type involves inclusion in the sieve reaction mixture of sources of aluminum, phosphorus, optionally silicon, an organic template and a compound having two fluoride substituents and capable of providing fluoride ions. The organic template preferably includes an amine of the general structure: $R^1R^2N-R^3$ wherein R^1 and R^2 can be alkyl groups containing from 1 to 5 carbon atoms and R^3 can be an alkyl of from 1 to 12 carbon atoms.

The Examiner notes that highly preferred R^1 and R^2 groups in the amines of Cao '983 (analogous to the R and R' groups of the amine in the present claims) are methyl groups and that the list of suitable R^3 amine substituents in Cao '983 expressly includes "n-butyl". From such disclosures the Examiner concludes that Cao '983 directly anticipates the rejected claims of the present application.

Appl. No. 10/617,852
Amtd. dated December , 2004
Reply to Office Action of September 23, 2004

In response to this assertion, applicants would note that in addition to defining the R and R' substituents of the amine used in molecular sieve formation, the present claims also expressly require that neither of the R and R' groups can be butyl. Cao '983, on the other hand, expressly lists "n-butyl" as one of the preferred substituents for R¹ and R². It is respectfully submitted that given this disclosure in Cao '983, this reference cannot constitute a direct anticipation of the presently rejected claims. This is because Cao '983 teaches just the opposite of one of the essential key elements of such claims and hence completely fails to teach this element. In light of this situation, it is submitted that rejection of Claims 1-4, 6-13, 16-22, 27 and 29 under 35 USC §102(e) as being directly anticipated by Cao '983 is improper.

Claims 1-4, 7-13, 16-22, 27 and 29 have been rejected under 35 USC §102(e) as being anticipated by or, in the alternative, under 35 USC §103(a) as unpatentably obvious over both US Patent No. 6,680,278 to Cao et al. (Cao '278) and US Patent No. 6,793,901 to Cao et al. (Cao '901). Such a rejection is also respectfully traversed as it would apply to the claims as amended herein.

Both Cao '278 and Cao '901 disclose methods for preparing aluminophosphate or silicoaluminophosphate molecular sieves of the CHA framework type. The reaction mixture described in both patents must contain in addition to sources of aluminum, phosphorus and optionally silicon, an organic template which includes a N, N-dimethyl amino material. (Cao '278 brings about CHA specificity by also using tetraethylammonium cations as a co-template in the reaction mixture whereas Cao '901 essentially includes fluoride ions to direct synthesis to the CHA framework type.) In both Cao '278 and '901, the dimethylamine material may be a tertiary amine wherein the third amine substituent is very broadly defined. Within this broad definition this third substituent may include alkyl groups having from 1 to 12 carbon atoms among many other types of chemical moieties. As with the rejection over Cao '983, the Examiner contends that this generic definition for the third amine substituent is sufficiently narrow to be anticipatory of a dialkylbutylamine material such as is used in the process and molecular sieves of the instantly claimed invention.

Appl. No. 10/617,852
Amtd. dated December , 2004
Reply to Office Action of September 23, 2004

Applicants respectfully submit that the C₁₋₁₂ alkyl group definition of the dimethylalkyl amine of the Cao '278 and '901 patents is too generic to constitute a direct anticipation of every single species falling within its broad scope and that the use of such a definition in these references would still permit identification of a single species from within the disclosed group as an essential element of a valid selection invention. The detailed discussion about the possible amine substituents in these two Cao patents would certainly not lead one to contemplate a butyl group for this dimethylamine material. In fact, every other alkyl group around butyl is specifically listed (i.e., ethyl, propyl, pentyl, hexyl and heptyl), but, significantly, butyl is not included. In light of this situation, it is submitted that rejection of Claims 1-4, 7-13, 16-22, 27 and 29 under 35 USC §102(e) as being directly anticipated by Cao '278 and '901, like the similar Section 102(e) rejection over Cao '983, is improper.

The same groups of claims rejected as discussed above as being directly anticipated have, in the alternative, also been rejected over these same three Cao patents as being unpatentably obvious under 35 USC §103(a). Applicants' attorney would note that both the instant application and all three of the Cao patents are assigned to ExxonMobil Chemical Patents, Inc. Applicants' attorney would further note that both the instant application and the three Cao references were, at the time the instant invention was made, either owned by or subject to an obligation of assignment to, ExxonMobil Chemical Patents, Inc. Accordingly, the obviousness rejection of Claims 1-4, 6-13, 16-22, 27 and 29 over these Cao references is not addressed at length herein because under 35 USC §103(c), none of these Cao patents can be used in a Section 102(e)/103 obviousness rejection in this situation. It suffices to note, however, that there is nothing in any of the Cao disclosures which, in any event, would suggest Applicants' selection of a specific tertiary butylamine organic template for use in synthesizing high purity silicoaluminophosphates of specific framework type.

Rejections For Obviousness-Type Double Patenting

Claims 1-4, 6-13, 16-22, 27 and 29 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-41 of Cao

Appl. No. 10/617,852
Amndt. dated December , 2004
Reply to Office Action of September 23, 2004

'983. Claims 1-4, 7-13, 16-22, 27 and 29 have also been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of Cao '278 and Cao '901. The Examiner contends that the generic disclosure of the amine template in the claims of these references would suggest that the specific members of the genus, such as applicants' tertiary butylamines, would have similar properties and could be used in the same way as the genus as a whole. Such an obviousness-type double patenting rejection is respectfully traversed.

As noted hereinbefore with respect to the Section 102(e) rejection, Cao '983 lists (and claims) n-butyl as one of the preferred R¹ and R² substituents of the amine template. This teaches directly away from applicants' claim requirement that neither of these substituents in the claimed invention can be butyl. Furthermore, as noted hereinbefore with respect to all three Cao patents, there is no specific or express teaching of any asymmetrical tertiary butylamine as a possible template in the preparation of the disclosed silicoaluminophosphate molecular sieves.

Applicants have in fact discovered that not all members of the genus used to describe amine templates in the Cao patent claims do have similar properties or perform in the same way in the context of applicants' invention. Applicants' selection of one member of the claimed genus, i.e., the tertiary butylamines, permits the preparation of high purity molecular sieves of both the CHA and AEL framework types without the essential use (at least for the Cao claimed preparation of CHA type sieves) of fluoride ion sources or quaternary ammonium co-templates. Nothing in any of the Cao claims suggests this specific amine selection or the beneficial results achieved thereby. In light of these considerations, it is submitted that rejection of Claims 1-4, 6-13, 16-22, 27 and 29 herein over the claims of the Cao patents for obviousness double patenting is improper and should be withdrawn.

Allowable Claims

The Examiner is thanked for the indication of allowable subject matter in Claims 5, 6, 14, 15, 23-26, 28, and 30. In the event that the claim rejections applied in this Office Action are not

Appl. No. 10/617,852
Amdt. dated December , 2004
Reply to Office Action of September 23, 2004

withdrawn, the Examiner is requested to clarify the status of Claim 6 which stands both rejected and characterized as allowable.

Conclusions

Applicants have made an earnest effort to place their application in proper form and to distinguish their claimed invention from the applied prior art. WHEREFORE, reconsideration of this application, entry of the amendments presented, withdrawal of the art and double patenting claim rejections, and allowance of amended Claims 1-30 herein are respectfully requested.

Any comments or questions concerning the application can be directed to the undersigned at the telephone number given below.

Respectfully submitted,

Date: 13 December 2004

By:



Frank E. Reid
Attorney for Applicant
Attorney Registration No. 37,918

ExxonMobil Chemical Company
Law Technology Department
P. O. Box 2149
Baytown, Texas 77522
(281) 834-1743 (Direct Dial)
Fax: (281) 834-2495